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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/562,933	12/30/2005	Tadao Nakaya	NFA-0215	3687

74384 7590 07/03/2008

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EXAMINER	
NELSON, MICHAEL E	
ART UNIT	PAPER NUMBER
1794	

MAIL DATE	DELIVERY MODE
07/03/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/562,933	NAKAYA ET AL.	
	Examiner	Art Unit	
	MICHAEL E. NELSON	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2 and 4-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 December 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *12/30/2005, 05/05/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The disclosure is objected to because of the following informalities:

2. On page 56 and 57, the structures of the compounds (32) and (33) do not agree with the method described on page 55, and the structure of compound (31). The method clearly describes the reaction of compound (31) with α-chloro-p-xylene, which should give products analogous to formula (28) and (29) shown on pages 51 and 52, where the nitrogen substituent is p-methylbenzyl, instead of p–methoxyphenyl as shown in formulas (32) and (33).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-2, 4-15 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for some compounds, does not reasonably provide enablement for all the compounds within the scope of claim 1. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make the invention commensurate in scope with these claims.

Case law holds that applicant's specification must be "commensurately enabling [regarding the scope of the claims]" *Ex Parte Kung*, 17 USPQ2d 1545, 1547 (Bd. Pat.

App. Inter. 1990). Otherwise **undue experimentation** would be involved in determining how to practice and use applicant's invention. The test for undue experimentation as to whether or not all compounds within the scope of claim 1 can be used as claimed and whether claim 1 meets the test is stated in *Ex parte Forman*, 230 USPQ 546, 547 (Bd. Pat. App. Inter. 1986) and *In re Wands*, 8 USPQ2d 1400, 1404 (Fed.Cir. 1988). Upon applying this test to claim 1, it is believed that undue experimentation **would** be required because:

(a) *The quantity of experimentation necessary* is **great** since claim 1 reads on a number of compounds, with specific requirements for R^3 while the specification discloses examples of most, but not all of R^3 groups, specifically, the 9,10-disubstituted anthracene structure.

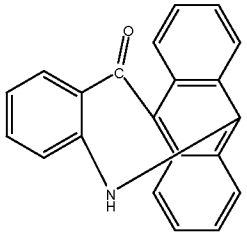
(b) There is **no** *direction or guidance presented* for the synthesis of a quinacridone where R^3 is a 9,10-disubstituted anthracene.

(c) There is an ***absence*** *of working examples* concerning compounds where R^3 is 9,10-disubstituted anthracene.

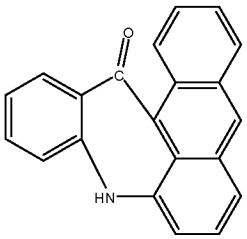
In light of the above factors, it is seen that undue experimentation would be necessary to make and use the invention of claims 1-2, and 4-15.

5. Claim 1 claims numerous quinacridone-like compounds with specific functionality R^3, which include phenyl, naphthyl, anthracenyl, and pyrenyl. One of the options for R^3, however, is a 9,10-disubstituted anthracene (formula (7)). The 2,3-disubstituted anthracene (formula (6)) is not a problem, since the two carbons joined to the quinacridone core are adjacent to each other. Given the synthetic methodology

provided in the specification, compounds with formulas (4)-(6) and (8) would be available to one of ordinary skill in the art. However, structure (7) requires a bridge from the core of the quinacridone to the 9 and 10 position of the anthracene ring, (partial structure illustrated below).



6. Such a structure (if even possible) would be under incredible strain due to the planar nature of both the core benzene ring and the anthracene ring. As a result, the methods described in the specification would not enable one of ordinary skill to synthesize this compound, since extremely specialized methods would be required to synthesize such a strained molecule. Furthermore, one of ordinary skill would predict that under the methods described in the specification, the immediate precursor would react more preferably at the 1 position of the anthracene, rather than the 10 position, resulting in the compound having the second structure shown below, which would maintain the planarity of both the core benzene and the anthracene rings, and be much more stable than the structure shown above.



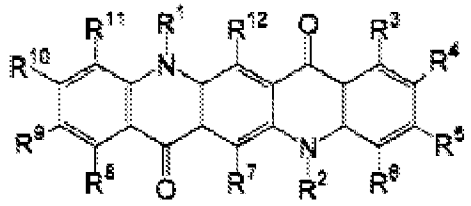
Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

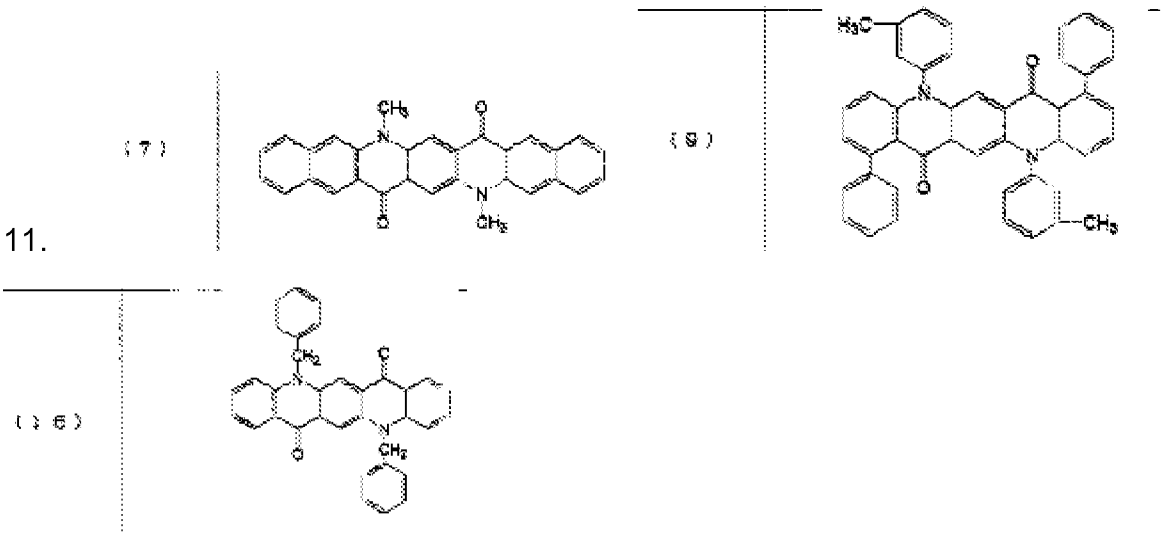
8. Claims 1, 4-6, 8, 10, and 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Tamano et al. (JP 09-013026).

9. Concerning claims 1, Tamano et al. describe material for organic electroluminescent devices having the general structure shown below, where at least one of R^1 and R^2 is a substituted alkyl, or substituted aryl substituent, and where adjacent substituents may join to form a ring. [0007]



10. As examples, the specific compounds shown below are disclosed.

11.



12. Given the similarity in structure between the compounds disclosed by Tamano et al. and the compounds described in the specification (particularly compound 16, compared with Applicant's compound 33 (based upon the synthetic description) which differ only by alkyl substituents), the compounds would be predicted to have the same inherent properties, i.e. white emitting compounds.

13. Concerning claims 4-6, 8, 10 and 12, Tamano et al. describe organic electroluminescent devices (layered articles, per claim 4) comprising the compounds described, where the device has an anode and a cathode (pair of electrodes) and a luminous layer between the electrodes containing the compounds described above (per claim 5), with a single light emitting layer (per claim 6). [0038] The devices described by Tamano et al. are planar (per claims 8, 10, and 12).

Claim Rejections - 35 USC § 103

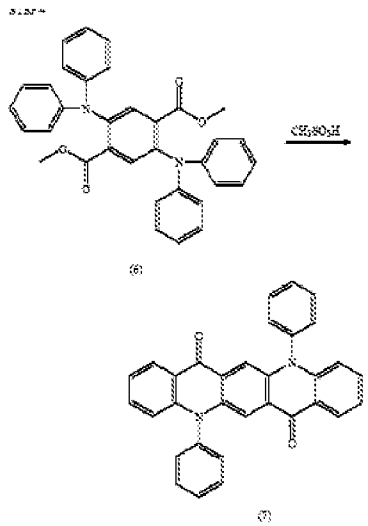
14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

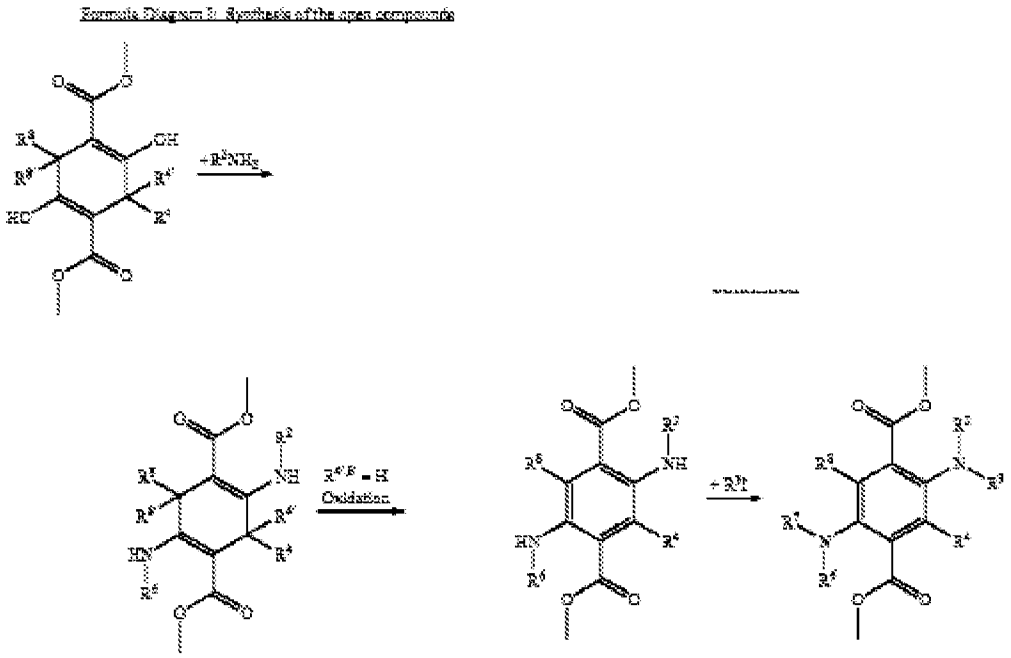
15. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tamano et al. (JP 09-013026) in view of Cosimbescu et al. (7,026,481) and Richter et al. (WO 03019697) based on English Language equivalent US (2005/0003230).

16. Concerning claim 2, Tamano et al. describe the compounds discussed above, and describe the synthesis by alkylation of quinacridone [0052]. Tamano et al. are silent on other methods of synthesizing the quinacridone compounds.

17. Cosimbescu et al. describes the synthesis of quinacridone compounds by cyclization of a disubstituted diaminoterephthalic acid compound, as illustrated by the scheme shown below, (column 5) but are silent on the extension of the method to alkyl substituents.



18. Richter et al. describes 2-5-diaminoterephthalic acid derivatives with disubstituted nitrogen by produced by alkylation as shown by the reaction scheme shown below. (see page 11, column 2).

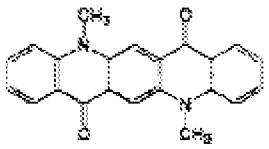


19. Given the teaching by Cosimbescu et al. on the formation of the quinacridone core by the cyclization of a disubstituted diaminoterephthalic acid compound, and the teaching of the alkylation of terephthalic acid compounds with alkyl substituents to form the disubstituted diaminoterephthalic acid compounds, it would have been obvious to one of ordinary skill to synthesize the compounds described by Tamano et al. using the methods disclosed by Cosimbescu et al. and Richter et al. since the method would be predicted to form the correct product given the similarity in structures.

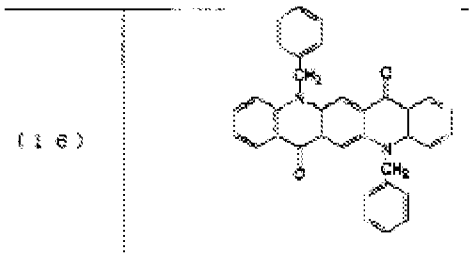
20. Claims 4-5, 7-8, 10, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suzuki et al. (US 2003/0038287) in view of Tamano et al. (JP 09-013026).

21. Concerning claims 4-5, 7-8, 10 and 14, Suzuki et al. describe an organic electroluminescent device (layered article, per claim 4), comprising an anode (20) , a hole injection layer (30), and a hole transport layer (31) [0052], followed by a first (32a) and second (32b) electron capture layers (light emitting layers per claim 7)), another luminescent layer (33), an electron transport layer (34), and a cathode (40) (see figure 8, [0051]-[0055]). The second electron capture layer comprises dimethylquinacridone as a light emitting component, which has the structure shown below. The articles are all planar (per claims 9, 10 and 14) Suzuki et al. are silent on the use of other quinacridone compounds in the light emitting layer.

(2)



22. Tamano et al. describes the compounds for use in organic electroluminescent devices, including the compound shown above (compound (2), page 5), and the compound shown below, (compound 16, page 8) according to claim 1 in order to provide an EL device with excellent stability and high luminous efficiency (paragraph 5).



23. Given this teaching, it would have been obvious to one of ordinary skill in the art to use the other compounds, also taught by Tamano et al. in the light emitting layer of the device described by Suzuki et al. since they are known equivalents, as disclosed by Tamano et al.

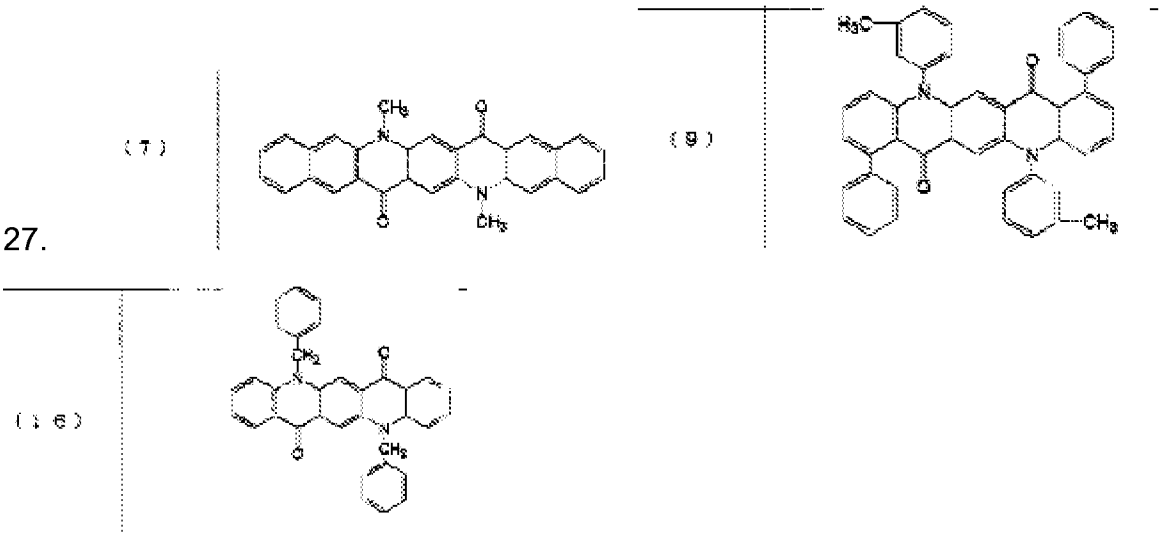
24. Claims 4-6, 9, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duggal et al. (6,538,375) in view of Tamano et al. JP 09-013026).

25. Concerning claims 4-6, 9, 11 and 13, Duggal et al. describe a organic light emitting diode with a tubular shape (per claims 9, 11, and 13) comprising a fiber core, an anode (ITO) (28) and cathode (27) (pair of electrodes) with an organic light emitting layer (23) between them (per claim 5), (See fig 3 and 4, and column 4, lines 28-49) with a single light emitting layer (per claim 6) which may comprises an amorphous film of luminescent small organic molecules which can be doped with other luminescent molecules. (column 7, lines 51-61) Duggal et al. are silent on the use of quinacridone compounds in the light emitting layer.

26. Tamano et al. describe quinacridone compounds including the compounds shown below, and disclose that when used with a host substance in a luminescent

layer, a light emitting luminance is high and the organic EL device is excellent in stability at the time of repeated use. [0039]

27.



28. Given this teaching, it would have been obvious to one of ordinary skill in the art to use the quinacridone compounds described by Tamano et al. in a host material in the tubular organic electroluminescent device described by Duggal et al. for the purpose of producing a device with high luminance and excellent stability.

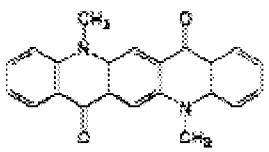
29. Claims 4-5, 7, 9, 11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duggal et al. (6,538,375) in view of Suzuki et al. (US 2003/0038287) and Tamano et al. (JP 09-013026).

30. Concerning claims 4-5 and 7, Duggal et al. describe an organic light emitting diode with a tubular shape (per claims 9, 11, and 15) comprising a fiber core, an anode (ITO) (28) and cathode (27) (pair of electrodes) with an organic light emitting layer (23) between them (per claim 5), (See fig 3 and 4, and column 4, lines 28-49) with a single light emitting layer (per claim 6) which may comprises an amorphous film of luminescent

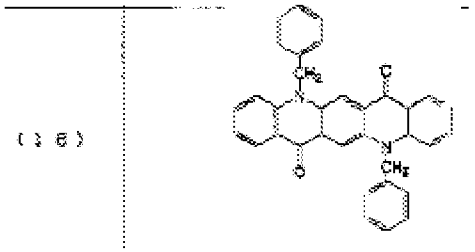
small organic molecules which can be doped with other luminescent molecules. (column 7, lines 51-61). Duggal et al. further disclose that the emitting layer (23) further comprises a hole injecting sublayer (723), a hole transporting sublayer (823), a luminescent sublayer (923), and an electron injecting (electron transporting) sublayer (1023). (column 11, lines 29-27) Duggal et al. are silent on devices with multiple light emitting layers.

31. Suzuki et al. describe an organic electroluminescent device comprising an anode (20) , a hole injection layer (30), and a hole transport layer (31) [0052], followed by a first (32a) and second (32b) electron capture layers (light emitting layers per claim 7)), another luminescent layer (33), an electron transport layer (34), and a cathode (40) (see figure 8, [0051]-[0055]). Suzuki et al. disclose that the electrons injected from the cathode into the luminescent layer and would otherwise drain into the hole transport layer, are captured by the electron capture layers. Thus the organic device efficiently and stably emits light, while a host organic material of the hole transport layer is prevented from deteriorating [0012]. The second electron capture layer comprises dimethylquinacridone as a light emitting component, which has the structure shown below. The articles are all planar (per claims 9, 10 and 14) Suzuki et al. are silent on the use of other quinacridone compounds in the light emitting layer.

(2)



32. Tamano et al. describes the compounds for use in organic electroluminescent devices, including the compound shown above (compound (2), page 5), and the compound shown below, (compound 16, page 8) according to claim 1 in order to provide an EL device with excellent stability and high luminous efficiency (paragraph 5)



33. Given this teaching, it would have been obvious to one of ordinary skill in the art to use the layer construction with multiple light emitting layers described by Suzuki et al. for the purpose of producing a device that efficiently and stably emits light, while a host organic material of the hole transport layer is prevented from deteriorating, and furthermore to use the compounds described by Tamano et al. in the luminescent layer since they are known equivalents to the materials described by Suzuki et al.

Conclusion

34. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Nakatsuka et al. (JP 11-054283), and Tamano (JP 2002-256168) also describe quinacridone compounds similar to the compounds above.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL E. NELSON whose telephone number is

(571)270-3453. The examiner can normally be reached on M-F 7:30am-5:00pm EST (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Callie Shosho can be reached on 571-272-1123. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Michael E. Nelson
Examiner
Art Unit 1794

/Callie E. Shosho/

Supervisory Patent Examiner, Art Unit 1794